AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A process for the enhanced production of pantothenate, comprising culturing a microorganism having a deregulated methylenetetrahydrofolate (MTF) biosynthetic pathway, under conditions such that pantothenate production is enhanced.

2. (Original) A process for the enhanced production of pantothenate, comprising culturing a microorganism having

(i) a deregulated pantothenate biosynthetic pathway, and

(ii) a deregulated methylenetetrahydrofolate (MTF) biosynthetic pathway,

under conditions such that pantothenate production is enhanced.

3. (Original) The process of claim 2, wherein said microorganism has at least two pantothenate biosynthetic enzymes deregulated.

4. (Original) The process of claim 2, wherein said microorganism has at least three pantothenate biosynthetic enzymes deregulated.

5. (Original) The process of claim 2, wherein said microorganism has at least four pantothenate biosynthetic enzymes deregulated.

6. (Original) The process of claim 5, wherein said microorganism has a deregulated ketopantoate hydroxymethyltransferase, a deregualted ketopantoate reductase, a deregulated pantothenate synthetase and a deregulated aspartate-α-decarboxylase.

7. (Currently Amended) The process of any one of claims 1 and 3-6 ~~claims 1 to 6~~, wherein said microorganism further has a deregulated isoleucine-valine (*ilv*) biosynthetic pathway.

8. (Original) The process of claim 7, wherein said microorganism has at least two isoleucine-valine (*ilv*) biosynthetic enzymes deregulated.

9. (Original) The process of claim 7, wherein said microorganism has at least three isoleucine-valine (*ilv*) biosynthetic enzymes deregulated.

10. (Original) The process of claim 9, wherein said microorganism has a deregulated acetohydroxyacid acid synthetase, a deregulated acetohydroxyacid isomeroreductase, and a deregulated dihydroxyacid dehydratase.

11. (Original) The process of any one of claims 1 to 10, wherein the microorganism has at least one MTF biosynthetic enzyme deregulated.

12. (Original) The process of claim 11, wherein the microorganism has a deregulated *glyA* gene.

13. (Original) The process of claim 11, wherein the microorganism has a deregulated *serA* gene.

14. (Original) The process of claim 11, wherein the microorganism has a deregulated *glyA* gene and a deregulated *serA* gene.

15. (Currently Amended) The process of claim 12 or 14, wherein the *glyA* gene is deregulated by mutating, deleting, or disrupting a the ~~microorganism has a mutated, deleted or disrupted~~ *purR* gene in said microorganism.

16. (Currently Amended) The ~~A~~ process of claim 2, wherein ~~for~~ the ~~production pantothenate, comprising culturing a~~ microorganism further has ~~having a deregualted pantothenate biosynthetic pathway,~~ a deregulated isoleucine-valine (*ilv*) biosynthetic pathway, ~~and a deregulated methylenetetrahydrofolate (MTF) biosynthetic pathway deregulated,~~.

17. (Currently Amended) The ~~A~~ process of claim 16, wherein ~~for~~ the ~~production pantothenate, comprising culturing a~~ microorganism ~~having a deregulated pantothenate biosynthetic pathway, a deregulated isoleucine-valine (*ilv*) biosynthetic pathway, and a deregulated methylenetetrahydrofolate (MTF) biosynthetic pathway,~~ is cultured under conditions such that at least 50 g/L pantothenate is produced after 36 hours of culturing the microorganism.

18. (Currently Amended) The process of claim 17, comprising culturing the microorganism under conditions such that at least 60 g/L pantothenate is produced after 36 hours of culturing the microorganism.

19. (Currently Amended) The process of claim 17, comprising culturing the microorganism under conditions such that at least 70 g/L pantothenate is produced after 36 hours of culturing the microorganism.

20. (Currently Amended) The ~~A~~ process of claim 16, ~~for the production pantothenate,~~ comprising culturing the ~~a~~ microorganism ~~having a deregulated pantothenate biosynthetic pathway, a deregulated isoleucine-valine (*ilv*) biosynthetic pathway, and a deregulated methylenetetrahydrofolate (MTF) biosynthetic pathway deregulated,~~ under conditions such that at least 60 g/L pantothenate is produced after 48 hours of culturing the microorganism.

21. (Currently Amended) The process of claim 20, comprising culturing the microorganism under conditions such that at least 70 g/L pantothenate is produced after 48 hours of culturing the microorganism.

22. (Currently Amended) The process of claim 20, comprising culturing the microorganism under conditions such that at least 80 g/L pantothenate is produced after 48 hours of culturing the microorganism.

23. (Currently Amended) The process of any one of ~~the preceding~~ claims 1, 2, and 16, wherein pantothenate production is further enhanced by regulating pantothenate kinase activity.

24. (Original) The process of claim 23, wherein pantothenate kinase activity is decreased.

25. (Original) The process of claim 24, wherein CoaA is deleted and CoaX is downregulated.

26. (Original) The process of claim 24, wherein CoaX is deleted and CoaA is downregulated.

27. (Original) The process of claim 24, wherein CoaX and CoaA are downregulated.

28. (Currently Amended) The process of any one of ~~the above~~ claims 1, 2, and 16, wherein said microorganism is cultured under conditions of excess serine.

29. (Canceled)

30. (Currently Amended) The process of any one of ~~the above~~ claims 1, 2, wherein said microorganism has the pantothenate biosynthetic pathway deregulated such that pantothenate production is independent of β-alanine feed.

31. (Currently Amended) The process of any one of ~~the above~~ claims 1, 2, wherein the microorganism is a Gram positive microorganism.

32. (Currently Amended) The process of any one of ~~the above~~ claims 1, 2, wherein the microorganism belongs to the genus *Bacillus*.

33. (Currently Amended) The process of any one of ~~the above~~ claims 1, 2, wherein the microorganism is *Bacillus subtilis*.

34.-41. (Canceled)

42. (Currently Amended) The ~~A~~ process of claim 16, ~~for producing pantothenate comprising culturing a recombinant~~ wherein said microorganism has ~~having:~~

~~(a)~~ a deregulated *panB* gene~~;~~ and

~~(b)~~ a deregulated *panD* gene; and

~~(c) at least one deregulated isoleucine-valine (*ilv*) biosynthetic enzyme-encoding gene;~~

and is cultured under conditions such that at least 30 g/l pantothenate is produced after 36 hours of culturing the microorganism.

43. (Currently Amended) The process of claim 42, wherein said microorganism ~~further has a deregulated methylenetetrahydrofolate (MTF) biosynthetic pathway~~

~~and said microorganism~~ is cultured under conditions such that at least 50 g/l pantothenate is produced after 36 hours of culturing the microorganism.

44.-45. (Canceled)

46. (Currently Amended) The ~~A~~ process of claim 2, ~~for producing pantothenate comprising culturing a recombinant~~ wherein said microorganism has ~~having:~~

~~(a)~~ a deregulated *panB* gene;

~~(b)~~ a deregulated *panD* gene; and

~~(c)~~ a deregulated *glyA* gene;

and is cultured under conditions of excess valine, such that at least 50 g/l pantothenate is produced after 36 hours of culturing the microorganism.

47. (Currently Amended) The ~~A~~ process of claim 2, ~~for producing pantothenate comprising culturing a recombinant~~ wherein said microorganism has ~~having:~~

~~(a)~~ a deregulated *panB* gene;

~~(b)~~ a deregulated *panD* gene; and

~~(c)~~ a mutated, deleted or disrupted *purR* gene;

and is cultured under conditions of excess valine, such that at least 50 g/l pantothenate is produced after 36 hours of culturing the microorganism.

48. (Currently Amended) The ~~A~~ process of claim 2, ~~for producing pantothenate comprising culturing a recombinant~~ wherein said microorganism has ~~having:~~

~~(a)~~ a deregulated *panB* gene;

~~(b)~~ a deregulated *panD* gene; and

~~(c)~~ a deregulated *ser*A gene;

and is cultured under conditions of excess valine, such that at least 50 g/l pantothenate is produced after 36 hours of culturing the microorganism.

49. (Currently Amended) The ~~A~~ process of claim 2, ~~for producing pantothenate comprising culturing a recombinant~~ wherein said microorganism has ~~having:~~

~~(a)~~ a deregulated *panB* gene;

~~(b)~~ a deregulated *panD* gene;

~~(c)~~ a deregulated *serA* gene; and

~~(d)~~ a deregulated *glyA* gene; and

is cultured under conditions of excess valine, such that at least 50 g/l pantothenate is produced after 36 hours of culturing the microorganism.

50. (New) The process of any one of claims, 1, 2, 7, 16, 23, 28, 30, and 42, wherein the microorganism has a deregulated *glyA* gene.

51. (New) The process of claim 50, wherein the *glyA* gene is deregulated by mutating, deleting, or disrupting a *purR* gene in said microorganism.